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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/400,350	09/20/1999	CLARENCE T. TEGREENE	MVIS-97-14CI	3341

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EXAMINER
NGUYEN, KEVIN M

ART UNIT	PAPER NUMBER
2674	

DATE MAILED: 04/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/400,350	TEGREENE ET AL.	
	Examiner	Art Unit	
	Kevin M. Nguyen	2674	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *3-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *3-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

1. The amendment filed on 1/23/2002 is entered. The rejections of claims 3-25 are maintained.

Drawings

2. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the plane 66 and the scan pattern 69 (page 5, line 23 and line 27) as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

3. The drawings (figure 8) are objected to under 37 CFR 1.83(a) because they fail to show the correction mirror 100 carries a deformable membrane 180 (page 17, lines 3-4) as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d).

4. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the deflector being of a type that produces a predicted deviation, and the optical element being responsive to the control signal to produce a corresponding correction that offsets the predicted deviation as described in the specification (page 11, lines 23-24). Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

5. Claim 7, 13, 17 and 21 are objected to because of the following informalities: MEMs are undefined. Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claim 6 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This claim claims MEMs membrane aligned to the MEMs scanning mirror. At page 29, 2nd and 3rd paragraph, the specification describes the deformable membrane 180 ...the corresponding deformable membrane for this application is referred to herein as aberration compensation membranes (ACM). Wave front aberration, as used herein refers to deviations of the actual constant phase wave front .....figure 44. How a deformable membrane responsive to the control signal to deform to produce the corresponding correction. Page 11, lines 23-24 the specification describes figure 26 is a signal timing diagram showing deviation of a sinusoidal scan position versus time from the position of a linear scan. How the optical element predicts deviation. The broadly describe voltage adjusting means for inducing a voltage rise or a voltage drop do not support the claimed invention.

8. Claim 21 is rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This claim claims MEMs membrane aligned to the MEMs scanning mirror. At page 29, 2nd paragraph, the specification describes the deformable membrane 180 ...the corresponding deformable membrane for this application is referred to herein as aberration compensation membranes (ACM). How the membrane deform range response time within a scanning period. The broadly describe voltage adjusting means for inducing a voltage rise or a voltage drop do not support the claimed invention.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 6, 3-5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi (US 5,185,676) in view of Perkins et al (US 4,093,351).

11. As to claim 6, Nishiberi teaches an optical scanning system which includes in input port, scan pattern (inherently), a laser 1, a laser beam 2, an x-axis beam scanning mechanism 3 can be driven by an electric motor, pivot mirrors 3a and 4a, the controlling part 22 controls the driving part 23 in compliance with the deviation signal from the deviation output part 21 (the deviation output part 21 produce a correction that offsets

the predicted deviation as claimed, see figure 2, col. 34-53, and col. 3, lines 52-60). Therefore, Nishiberi teaches all of the claimed limitation of claim 6, except for "the controllable optical element includes a deformable membrane." However, Perkins et al teaches a related optical scanning system having the controlled flexible membrane 10. The flexible membrane 10 is controlled by the processor unit 38 (see figure 1, col. 3, lines 25-29). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the additional flexible membrane taught by Perkins et al into the optical scanning of Nishiberi's system in order to design with glass mirror surface for instance and additionally is particularly adaptable to active figure control (see col. 1, lines 7-11 of Perkins et al).

12. As to claim 3, Nishiberi teaches pivot mirrors 3a and 4a.

13. As to claim 4, Nishiberi teaches the beam detecting means 7 controlling the offset deviation of the reflected beam 2b for the target value (see figure 2, col. 3, lines 50-57).

14. As to claim 5, Nishiberi teaches biaxial rotation x axis and y axis (see figure 2).

15. As to claim 8, Nishiberi teaches a pivot mirror 3a providing the target valued signal by the deviation outputting part 21 (see figure 2).

16. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi in view of Perkins et al as applied to claim 6 above, and further in view of Application Admitted Prior Art hereinafter AAPA.

17. As to claim 7, Nishiberi and Perkins et al teach all of the claimed limitations of claim 6, except for "the deformable is a MEMs device." However, AAPA teaches MEMs

scanner 3700 (page 55, line 25). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the MEMs 3700 taught by AAPA into the optical scanning of Nishiberi's system because MEMs device is very know in the art (see page 55, line 25 of AAPA).

18. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi in view of Balasubramanian (US 4,272,151) and further in view of Gal et al (US 5,444,5782).

19. As to claim 9, Nishiberi teaches an optical scanning system which includes in input port, scan pattern (inherently), a laser 1, a laser beam 2, an x-axis beam scanning mechanism 3 can be driven by an electric motor, pivot mirrors 3a and 4a, the controlling part 22 controls the driving part 23 in compliance with the deviation signal from the deviation output part 21 (the deviation output part 21 produce a correction that offsets the predicted deviation as claimed, see figure 2, col. 34-53, and col. 3, lines 52-60). Nishiberi fails to teach "the predicted deviation is a phase front distortion." However, Balasubramanian teaches an related optical scanning system which includes the enclosure 23 delineating a simple optical element 24 that predetermine amount to astigmatically correct any deviation in the angular relationship in the beam wave front relative to the desired beam path (see figure 1, col. 5, lines 2-8). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the additional optical element 24 taught by Balasubramanian into the optical scanning of Nishiberi's system in order to provide both high resolution and high speed (col. 1, line 7-8 of Balasubramanian). Therefore, Nishiberi and Balasubramanian teach all of the

claimed limitations of claim 9, except for "the corresponding distortion correction is an offsetting phase front distortion." However, Gal et al teaches a related optical scanning system which includes a wave front corrector for scanning micro lens arrays (see abstract). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate a wave front corrector taught by Gal et al into the optical scanning of Nishiberi's and Balasubramanian's in order to obtain acceptable imaging at the detector plane (see col. 2, lines 65-68 of Gal et al).

20. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi in view of Balasubramanian and in view of Gal et al as applied to claim 9 above, and further in view of Perkins et al.

21. As to claim 10, Nishiberi, Balasubramanian and Gal et al teach all of the claimed limitations of claim 9, except for "the controlled optical element is a deformable membrane." However, However, Perkins et al teaches a related optical scanning system having the controlled flexible membrane 10. The flexible membrane 10 is controlled by the processor unit 38 (see figure 1, col. 3, lines 25-29). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the additional flexible membrane taught by Perkins et al into the optical scanning of Nishiberi's, Balasubramanian's and Gal et al's system in order to design with glass mirror surface for instance and additionally is particularly adaptable to active figure control (see col. 1, lines 7-11 of Perkins et al).

22. Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardy (US 3,923,400).

23. As to claims 11 and 15, Hardy teaches a real-time wave front correction system, which includes an image sensor 28, referring to FIG. 1 there is illustrated a preferred embodiment of applicant's invention. In FIG. 1 an objective lens 10 at the entrance pupil to the telescopic optical system produces a raw image 12 of a distant object at the prime focal plane of the optical system. This image may be severely distorted because of random wave front tilts and phase shifts produced by atmospheric turbulence. In FIG. 1 the telescope is illustrated as a refractive instrument. However, the principle of operation of applicant's invention works equally well with reflective telescopic optical systems. A field lens 14 and a relay lens 16 functions in combination to produce an image of the wave front received at the entrance aperture (at objective lens 10) on a phase corrector 18. Also, the field lens 14 functions to prevent off axis radiation, illustrated at 20, from missing the relay lens 16. The image of the incoming wave front produced on phase corrector 18 allows it to selectively change the phase of different areas of the wave front image (see col. 2, lines 47-66).

24. Claims 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hardy in view of Perkins et al.

25. As to claims 12-14, Hardy teaches all of the claimed limitations of claim 11, except for "the wave front corrected includes a deformable membrane." However, Perkins et al teaches a related optical scanning system having the controlled flexible membrane 10. The flexible membrane 10 is controlled by the processor unit 38 (see figure 1, col. 3, lines 25-29). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the additional flexible membrane taught

by Perkins et al into the optical scanning of Hardy's system in order to design with glass mirror surface for instance and additionally is particularly adaptable to active figure control (see col. 1, lines 7-11 of Perkins et al).

26. Claims 16, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi.

27. As to claim 16, Nishiberi teaches an optical scanning system which includes in input port, scan pattern (inherently), a laser 1, a laser beam 2, an x-axis beam scanning mechanism 3 can be driven by an electric motor, pivot mirrors 3a and 4a, the controlling part 22 controls the driving part 23 in compliance with the deviation signal from the deviation output part 21 (the deviation output part 21 produce a correction that offsets the predicted deviation as claimed, see figure 2, col. 34-53, and col. 3, lines 52-60). Therefore, Nishiberi teaches all of the claimed limitation of claim 6, except for "the controllable optical element includes a deformable membrane. It would have been obvious to a person of ordinary skill in the art at the time of the invention to recognize that Nishiberi teaches pivot mirrors 3a and 4a are controlled by the controlling part 22 controls and the driving part 23 as claimed as the scanner orientation of the scanning mirror in the predetermined angular ranged.

28. As to claims 19 and 20, Nishiberi teaches the optical 7 for redirect beam of light (see figure 1).

29. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi as applied to claim 16 above, and further in view of Application Admitted Prior Art hereinafter AAPA.

30. As to claims 17 and 18, Nishiberi teach all of the claimed limitations of claim 16, except for "the deformable is a MEMs device." However, AAPA teaches MEMs scanner 3700 (page 55, line 25). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the MEMs 3700 taught by AAPA into the optical scanning of Nishiberi's system because MEMs device is very know in the art (see page 55, line 25 of AAPA).

31. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi (US 5,185,676) in view of Perkins et al (US 4,093,351).

32. As to claims 21 and 22, Nishiberi teaches an optical scanning system which includes in input port, scan pattern (inherently), a laser 1, a laser beam 2, an x-axis beam scanning mechanism 3 can be driven by an electric motor, pivot mirrors 3a and 4a, the controlling part 22 controls the driving part 23 in compliance with the deviation signal from the deviation output part 21 (a MEMs scanning mirror as claimed, see figure 2, col. 34-53, and col. 3, lines 52-60). Therefore, Nishiberi teaches all of the claimed limitation of claim 21, except for "the controllable optical element includes a deformable membrane." However, Perkins et al teaches a related optical scanning system having the controlled flexible membrane 10. The flexible membrane 10 is controlled by the processor unit 38 (see figure 1, col. 3, lines 25-29). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the additional flexible membrane taught by Perkins et al into the optical scanning of Nishiberi's system in order to design with glass mirror surface for instance and additionally is particularly adaptable to active figure control (see col. 1, lines 7-11 of Perkins et al).

33. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi in view of Perkins et al as applied to claim 21 above, and further in view of Darrow et al (US 6,201,980).

34. As to claim 23, Nishiberi and Perkins et al teach all of the claimed limitations of claim 21, except for "the MEMs membrane has a resonant frequency." However, Darrow teaches the deformable membrane MEMs actuator device can be configured to form a variable planar inductor (col. 6, lines 46-48), the pad 110, 11 completing the L-C circuit (col. 7, lines 25-27). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the additional MEMs membrane having L-C circuit taught by Darrow into the optical scanning of Nishiberi's system in order to scan the image display more qualify.

35. Claims 24 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishiberi in view of Perkins et al as applied to claim 21 above, and further in view of Gal et al.

36. As to claims 24 and 25, Nishiberi and Perkins et al teaches all of the claimed limitations of claim 21, except for "the desired deformation range is sufficiently large to correct for phase front distortion..." However, Gal et al teaches an additional wave front corrector 61 (see figure 1). It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the additional wave front corrector 61 taught by Gal et al into the MEMs scanning of Nishiberi's system in order to produce a wave front correction needed for polychromatic light for acceptable imaging at the detector plane (see col. 2, lines 65-68 of Gal et al).

Response to Arguments

37. Applicant's arguments filed 1/23/2002 have been fully considered but they are not persuasive.

38. Applicant's arguments with respect to claims 3-25 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

39. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Kevin M. Nguyen** whose telephone number is **703-305-6209**. The examiner can normally be reached on MON-FRI from 9:00-5:00 with alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Richard A Hjerpe** can be reached on **703-305-4709**.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

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or faxed to:

(703) 872-9314 (for Technology Center 2600 only)

Hand-delivered response should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Kevin M. Nguyen
Examiner
Art Unit 2674

RICHARD HJERPE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600